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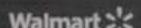
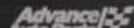
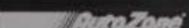


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SHOP TALK



Andy Reynolds at Outlaw Armageddon.

MOTORSPORTS: PICK YOUR POISON

Hello from Oklahoma City! I'm writing this from the terminal at Will Rogers International Airport, still recovering from one of the most spectacular drag races I've ever been to: the Outlaw Armageddon Invitational No-Prep race that took place at Thunder Valley Raceway Park August 14–15.

What made it so cool? First and foremost, the obvious answer is the cars. Some of the fastest cars in the country were here, and even though the clocks were turned off, I'm sure we witnessed a bunch of 4-second passes, even on the unprepped track surface. Second, lots of drama was created by having the fastest cars in attendance. Now I don't mean trash talking and bickering among drivers, I mean the tension you feel as a spectator—never knowing what's going to happen when the cars launch, which leads me to my third point: the action is wild and unpredictable. The fastest car doesn't always win, nor does the most expensive car or the team with the biggest tractor-trailer and hospitality tent. The no-prep format means the track isn't sprayed and dragged at all throughout the event. Spills are cleaned safely, the track is swept clean of debris, and drivers are allowed to do burnouts in a small pool of traction compound prior to rolling up to the starting, but that's it. The car's suspension has to

be set up right, and the driver has to be on his game or else he gets gapped. Fourth, the cars still look like cars, not amorphous shapes with painted-on styling cues. Many of them still have original glass, steel body panels, and curb weights similar to stock. The fifth and final reason was spectator participation. This was one of the best-attended races I've been to in all my years with **Car Craft**. The crowd came early, stayed late, sat all day in the hot sun, and waited in long lines to get into the track, to get food at the concession stands, and to buy merch and get autographs from their favorite drivers. Yes, the fact that most of the guys from Discovery Channel's *Street Outlaws* were there most likely boosted attendance, but this is Oklahoma City—there's a strong chance you'd run into one of these guys at a gas station, so I honestly believe the crowd was here for the racing, not celebrity-spotting. And even if they were there to meet the stars of *Street Outlaws*, is that really so bad? The larger point is they are at a track participating in motorsports, and that is very encouraging. I was impressed by the number of kids in attendance, too. Granted, the kids were likely drawn in by the TV show, but that's actually good for the sport. Hell, anything that gets a kid to put down his or her phone or tablet and interested

in something tangible is a good thing, whether it's engines or not.

The weekend's huge, enthusiastic crowd really got me thinking. We've covered lots of drag-radial and no-prep racing lately, because I believe it's the format that resonates best with you, the **Car Craft** reader. Sales numbers and online page views bear this out, but I'd still like some feedback. Do you want to see more racing like this, or are you sick of drag racing? I like road racing a lot, too, and like to watch those types of events ranging from local club track days to the Continental Tire SportsCar Challenge series. Though there is a rivalry between straight-line racing and corner carving, there is plenty of skill, knowledge, and science in getting either one of these kinds of cars to work, whether your intention is to pull more than 1 g in a tight corner or more than 3 g in a straight-line launch. Let me know what you think. Send your feedback to CarCraft@CarCraft.com, and please tell us what you drive and what form of motorsports you participate in. —John McGann

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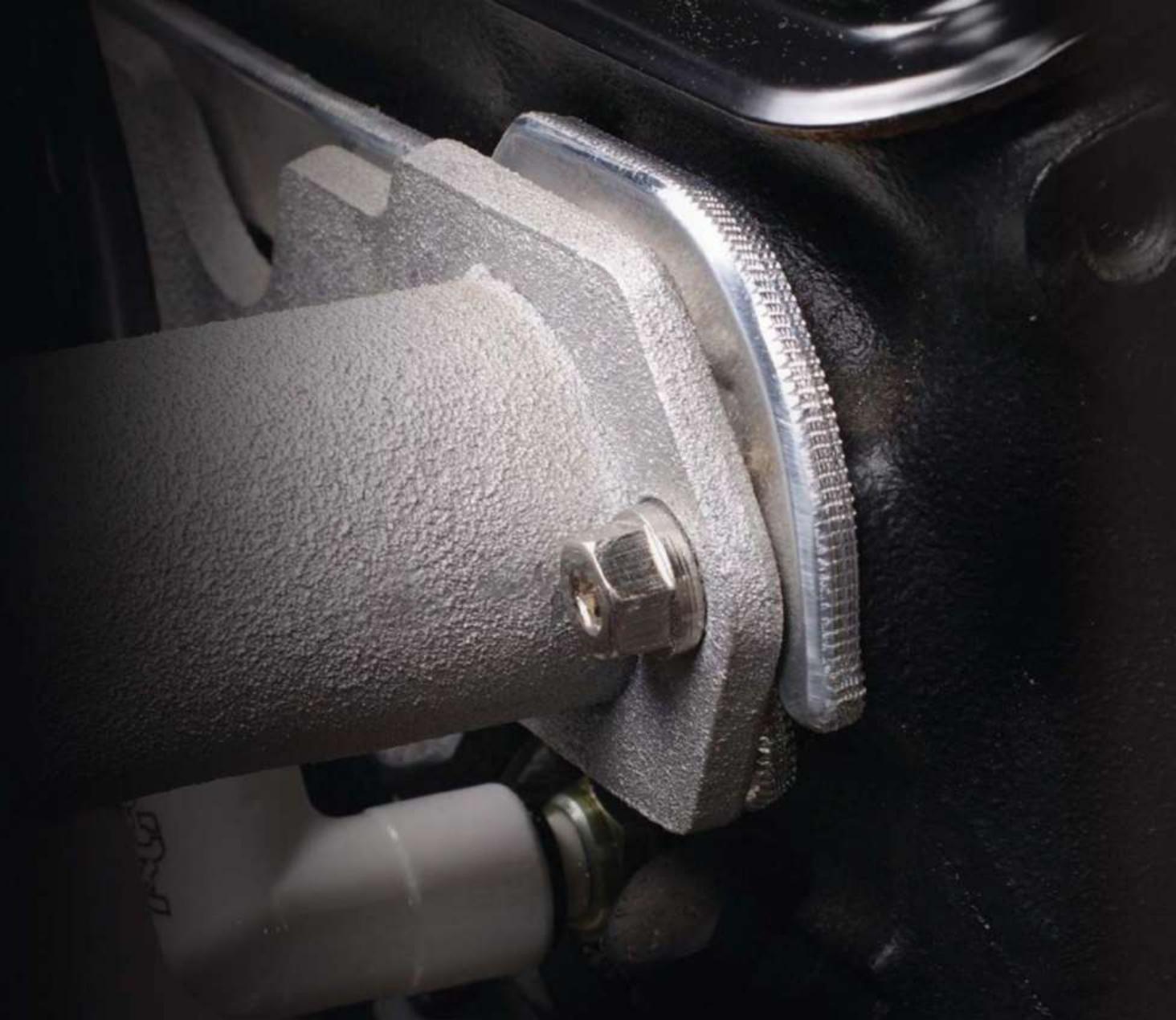
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ACTION!

Doomsday No Prep Shootout: North Star Dragway



By John McGann / Photos: John McGann

This is grassroots drag racing at its finest. We met Michael Hollis last year at Lights Out V at South Georgia Motorsports Park and were big fans of his unpretentious big-block-powered 1969 Nova, one of a very few X275 cars at that event to show up on an open trailer. Shortly after Lights Out, Mikey announced Doomsday on Facebook—a no-prep race at North Star Dragway in Denton, Texas. We liked the format: heads-up racing, random pairings, few rules, and cash payouts to the winners. We took a chance on it and weren't disappointed.

The classes were Big Tire, Small Tire, True Street, and Outlaw. The Small Tire class restricts tire size to 29.5x10.5 (non W) tires; wheelie bars are prohibited. Big Tire class allows 315mm radial and 10.5W slicks or larger tires. Back-halved cars are allowed in both Big Tire and Small Tire classes. True Street cars must retain the stock suspension, must run 275, 28x11.5, or smaller DOT tires. The cars must be registered and insured. The Outlaw class is wide open, run-what-you-brung.



After the True Street cars returned, pairings for all the classes were chosen by drawing numbers out of a Crown Royal bag. Racers were allowed to call out another competitor if they wished to race someone in particular.



Friday night prior to the race, teams were allowed to perform practice runs at the top end of the track. This allowed the competitors to get a feel for the amount of traction that would be available during the race and adjust their cars accordingly.



Andy Reynolds of Hurst, Texas, won True Street with his 1979 Malibu wagon. Also powered by a Morgan & Sons engine, this 'Bu sports an 11.0:1 400-inch small-block with Dart heads and a Bullet solid roller cam. A Monte Smith nitrous plate adds about 300 extra horsepower, which gets funneled to the ground through a Rossler TH400 trans and a Moser 9-inch.





On race day, True Street competitors had to drive a 30-mile loop around the track, which included a stretch on the highway and the side streets surrounding the track. All cars made the drive with no problems.

No times were posted. The winning driver was indicated by a light in his respective lane (the left lane in this picture).



The unprep'd track surface made for some wild action: the VHT burnouts meant cars would hook off the line, but would often get squirrely about half-track. You need good instincts and quick reflexes to stay in the groove.



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Though the pre-stage and staging process were normal, there was no amber-bulb countdown. Once fully staged, drivers left on an instant green light.



Check out this 1976 Chevy LUV driven by Jerome Koerth. Builder/tuner Jerry Humphrey told us it's powered by a simple 383 with 23-degree Profiler heads, a Scat rotating assembly with Diamond pistons, and an Eron 4/7-swap nitrous cam. The compression ratio is 13.0:1, which requires C16 race gas. The owner, Greg Hall, runs a grave-digging company. Business is good, and he said, "I'm the last guy who will let you down."

Another of our favorites was Meatwagon, a 1980 Mercury Zephyr owned by Big Hal Anderson of Carrollton, Texas. He bought the car for a mere \$700 and sold its stock 302 for an even \$700, meaning the car was virtually free. In place of the 302 is a 6.0L Chevy built with an Eagle rotating assembly and production LSA cylinder heads. It's backed by a Powerglide and the original 8.8 rear.



The Big Tire winner was Randy Thorn in his gorgeous 1968 Camaro.



Shayne Ward of Fort Worth, Texas, won the Small Tire class with his 1988 Mustang, powered by a stroked 351W built by Morgan & Sons with out-of-the-box Trick Flow Track Heat cylinder heads. Boosted by an 88mm turbo and backed by a Powerglide built by Nate the Tranny Man, Shane said he's still dialing in the car, which was freshly built to compete in this race. He took home \$2,500 for the win.



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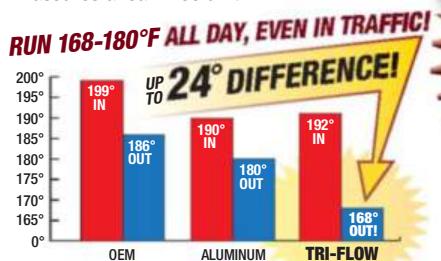
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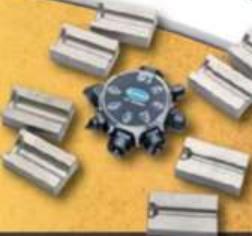
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IGNITION

An MSD Power Grid system controls the timing and provides the power to light the fire off. Ralph has experimented with timing, and found out that 27 degrees seems to provide the safest combination of power and longevity.

INTAKE

We haven't seen a log-style intake on anything in years, so we asked Ralph about it. He explained that he learned through experience with fire-extinguisher systems that dead-ends didn't matter as much as tubing length did with respect to even distribution. This log-style, four-barrel arrangement was the simplest he could design while keeping everything equal.



1,300HP, 540CI BIG-BLOCK CHEVY

Ralph Willis / Salinas, CA

While walking through the pits at a local grudge race, we stopped dead in our tracks at the sight of this all-aluminum, 540ci engine in Ralph Willis' 1964 Pontiac LeMans. Having a Chevy-based engine wasn't what drew us to it, though. Instead, it was the completely wild blow-through, dual-carb induction system that was pressurized by a mammoth 91mm turbo. The more we talked to Ralph, the more interesting the story became. Tales of boat parts, carburetors controlled by nitrous solenoids, a Bonneville turbo, and old-school Donovan block unfurled, and our questions came hard and fast. We found out everything there was to know about Ralph's engine, and best of all, we saw it power the 3,400-pound LeMans to an 8.27 at 164-mph pass with a wild 1.19-second 60-foot time. It was also the cleanest running turbo car on the grounds, with no black smoke, no trouble spooling, or any weird burps and pops. How can a huge, single-turbo, dual-quad, blow-through car do that? We still don't know, but we have a video as proof, and the full details on one of the most impressive home-built combinations we've seen in a while.

By Jason Sands / Photo: Jason Sands

LONG-BLOCK

Ralph's 540-cid engine is an interesting mix of new, used, one-off, and off-the-shelf parts. The O-ringed Donovan aluminum block is filled with a Callies crank and GRP rods. A set of bone-stock 9:1 flat-top pistons from JE provide the compression, and 357cc AFR heads secured with ARP studs and a copper gasket provide the airflow. The cam is extremely mild, at 252/254 degrees of duration at 0.050-inch lift, with a 112-degree lobe-separation angle. Ralph said the valve-springs and Jesel rocker arms have been in the motor "for at least a couple years," with no issues.

CARBURETORS

The dual quads were installed because Ralph couldn't get enough air into the engine with a single four-barrel. Now with twin 0.130-inch needle and seat assemblies and power valves that are CO₂-activated at 5 psi, the 800-cfm Pro-form-bodied Ralph Specials deliver more than enough fuel for 1,300 hp.



BOAT MANIFOLD

Since Ralph wanted to keep a stock hoodline, mounting the carburetors required some creativity. When a single four-barrel couldn't keep up, Ralph fabbed a plate onto the lower half of a blower manifold from a marine application, then placed the carburetors in as central position as possible for even fuel distribution. The carbs are topped with Extreme Velocity hats.

TUNING

Ralph said this unique combination took a whole lot of testing and tuning to dial in, but seems to be happy with it now. With about 40 passes on the current setup, Ralph recently data-logged the air fuel. He said the AFR was bouncing all over until the boost hit, but when it did, the engine was about 11.2:1 to 11.5:1 at full throttle. "Now I'm afraid to touch anything," he said, laughing.

FUEL SYSTEM

Ralph didn't skimp on the fuel system, going straight to a beltdriven Aeromotive pump that feeds a regulator that starts at 6.5 psi. As boost rises, 1 pound of fuel pressure is added for every pound of boost, so the final fuel pressure is around 26.5 psi at full song.

WATER/METHANOL INJECTION

We were curious at how the heck Ralph could run 20 psi on gasoline with no intercooler without burning up parts. He thinks his water-methanol injection system has something to do with it. A big single nozzle from Snow Performance and a 50/50 mix is sprayed directly into the inlet of the turbo when the engine is under boost for added fuel and cooling.



TURBOCHARGER

This is a used turbocharger from a Bonneville race car. The 91mm AiResearch turbo pushes 20 to 22 psi of boost into the big Chevy, without breathing hard. Ralph built the 2½-inch headers by himself. He also made the 5-inch downpipe that exits the turbocharger.

SPEED PARTS

By Albert Hernandez

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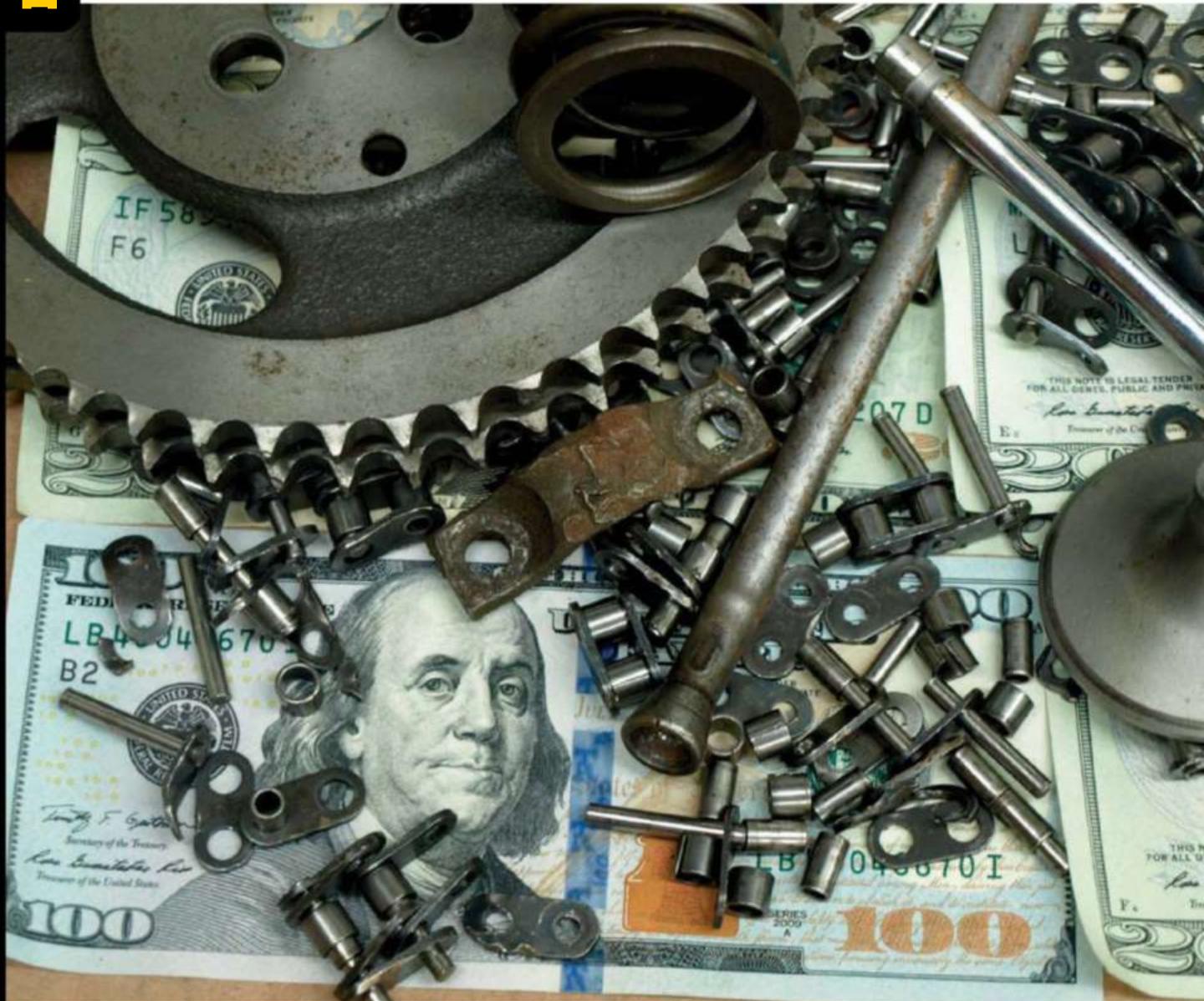
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LESSONS LEARNED

Steve Magnante Reflects On Some Classic Mechanical Meltdowns

By Steve Magnante / Photos: Steve Magnante



→ I've been turning wrenches on my cars since 1987, when I was 23 years old. I'd have started a lot earlier, but my dad was a college physics professor with zero appreciation for cars. He wisely insisted that I finish college before buying

anything fun. I lived up to my end of the deal (got my B.A. from Clark University in May 1986), then immediately started messing with old Mopars. A 1968 Hemi Charger kicked it all off, and I've since owned a string of nearly 50 Chevys, Fords, and Mopars.

Along the way, I've learned many lessons. Some were easy, others almost too painful to think about. Fortunately, I've documented just about every one of them with pictures and written notes. Here's a quick rundown of some experiences I've had—and learned from.

1

GROW A THIRD ARM

I was in the process of disassembling this 1965-vintage Dodge 383 in 1988 when I learned an expensive lesson about gravity. I'd yanked the cast-iron, dual-quad intake manifold (a rare 1958 Dodge D500 unit), the small valve, small port 516 casting heads, and mild hydraulic cam. With the lifters removed—and placed carefully into a marked egg carton for reuse—I flipped the engine block over to remove the rotating assembly. With the rod cap removed and the rod bolts isolated by rubber fuel lines (to protect the journals from scratches), I worked

each rod and piston assembly downward using a long, wooden dowel. The first few slipped free and into my waiting palm as planned. But the fourth one was a repeat of my high school baseball performance as a right fielder. The proverbial ball went right past my open glove and landed on the cement floor with a sickening thud. I'd been planning on reusing the 10:1 slugs, but that scheme was shattered—along with one of the delicate skirts. **Lesson learned:** Have a helper catch piston/rod assemblies during disassembly.



2

ALWAYS MAGNAFLUX USED CONNECTING RODS

The broken 383 piston forced a decision to either source a single replacement, buy a matched set of eight replacements, or skip the low-deck 383 and put the same money into a raised-deck 440 I had in reserve. Hoping to keep up with the nitrous-fed 5.0 Mustangs and Chevy big-blocks ruling the local scene, I chose the latter. Somehow I got it into my head the stock forged steel 440 rods wouldn't be good enough. So I scored a set of used Six Pack rods from an ad in *Hemmings Motor News*. They arrived, I marveled at their wider beams, and installed them without a second thought. A few weeks later, during the car's maiden voyage, the No. 7 rod broke at 6,000 rpm. Amazingly, the engine was still running, but the wild imbalance of seven cylinders firing was a clear indication of disaster. My buddy shouted to me, "don't shut it off!" so we drove it back to his garage a few miles away. It was raining, he didn't want to get wet walking home. I bought a single replacement rod and piston from Mancini Racing, had the block sleeved, and was able to save the 440. **Lesson learned:** If you must run used connecting rods, by all means, have them inspected for hidden cracks before use.



3

SHUN CHEAP TIMING SETS WITH TWO-PIECE ROLLERS

In 2005, I built a 520ci, Hemi-powered 1967 Dart sedan using a set of Stage V Engineering Hemi Conversion heads. They worked great and the car ran high-10s on pump gas, but I'll never live down the fact I didn't inspect the timing set more closely before installing it. Tasked with controlling a solid roller cam with 0.657 lift and triple valvesprings at 7,000 rpm, the timing set was a vital link in maintaining proper valve-to-piston clearance. In July 2005, with the *Hot Rod TV* cameras rolling, the Hemi expired at 7,000 rpm on the K&N chassis dyno in Riverside, California. We were hoping to shoot an oil-viscosity comparison using my Hemi-powered Dart as the mule. A post mortem revealed the cheap, folded steel timing chain rollers had disintegrated after a few thousand miles of use. The engine required new valves and two sleeves, but was rebuilt. You can bet I inspected the replacement timing chain to make sure it featured solid, one-piece rollers in every link! The TV segment survived, too, thanks to the last-minute substitution of a K&N employee's late-model Corvette as the test car. **Lesson learned:** Inspect timing chain rollers to ensure one-piece construction.



SPIRAL SCRATCH

Though Mopars are my core, I'm also totally cool with Ford and Chevy iron—heck, anything made in Detroit is OK by me. Back in 2001, I got a GMPP 502/502 crate engine and stuffed it into an altered-wheelbase 1963 Nova called the Wilshire Shaker. Intended to be a streetable tribute to the altered-wheelbase match racers of the 1960s, I quickly discovered the hydraulic roller cam limited engine speed to about 5,500 rpm. An aftermarket roller cam, spring, and rocker-arm package remedied the problem and the 502 was soon cranking 7,000 rpm. Without naming names, the 502 also developed a habit of killing pushrod tips. Within a week of driving, the sound of excess, isolated valve lash at a few cylinders forced an inspection. Sure enough, a few tips exhibited odd wear patterns where a raised nipple of metal was formed into the curved ball at the rocker-arm end. Close examination revealed that the hardened metal pushrod cups pressed into the forged-aluminum rocker arms exhibited spiral-like scores, the result of a dull cutting or finishing tool during their manufacture. Not every rocker had the problem, only a few. Replacement rockers and pushrods in the afflicted locations cured the problem. **Lesson learned:** Manufacturing defects can strike even the best name brands; take a close look at every part before installation.



CLOGGED TUBES

Another valvetrain-related issue I've seen more than a few times pertains to pushrods. In particular, I'm talking about the hollow, "oiling-style" pushrods with holes drilled into the tips as used with most hydraulic camshafts and certain solid rollers. Though it is nice to assume that brand-new parts can be unwrapped and installed in a new engine without further attention, I've witnessed several occasions where aiming these pushrods at a light source reveals darkness. Since pressurized oil is meant to flow through the hollow tubes and drilled tips, this was alarming. A quick blast of compressed air cleared the way, but the resulting blob of gritty, oily debris that landed in my palm made me shudder at the thought of this trash circulating through the rest of the engine or scarring the mating surfaces upon initial start-up. The result of a skipped final cleanout step by the manufacturer was the cause of the debris. **Lesson learned:** Use pressurized air and solvent to ensure open pushrod tubes.



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Unwanted debris loves to hide inside typical cast-aluminum (or iron) intake manifolds. Single-plane castings are easy to clean, while dual-plane units have hidden areas and take more time. But make it an elaborate, plenum-style tunnel ram and you've got a veritable mansion of dirty secrets waiting to be dislodged into your freshly assembled powerplant. In particular, the Mopar Max Wedge cross-ram manifold (new or used) takes special care. Fastened to the cylinder heads via eight bolts, installation involves juggling no less than 16 washers, 12 of which must pass through small access holes that are later sealed with screw-in plugs. I fell victim in 2012 when a 440-based Max Wedge clone engine I'd built for *Car Craft* (see the Nov. 2007 issue) inhaled a loose washer I'd inadvertently lost track of within the void of the Max Wedge plenum. The picture shows a before/after washer comparison and the crunched piston crown that resulted. In a repeat of my 1988 piston drop, I was faced with sourcing a single replacement piston or doing something more. In the end, a 440 Source 512 cube stroker kit remedied the problem (see the Nov. 2012 issue of *Car Craft* for the full story). **Lesson learned:** Inspect and clean the inside of any intake manifold before use and confirm the successful installation of all fasteners and washers.



6

VALVESPRING LIFE CYCLE

It's generally assumed that one or more failed valvesprings will affect engine performance in an immediate and obvious way. From valve-to-piston contact and total destruction to a "dead hole," valvespring failures typically draw immediate attention—and repair. Thus, I was amazed in the summer of 2014 to find three broken springs in the Wilshire Shaker Nova's Chevy 502, yet it still ran fine all the way up to the EFI computer's 6,500-rpm redline! Equipped with a 0.615/0.636 lift solid roller cam and matched double-with-damper valvesprings, I was doing a routine valve-lash inspection when the discovery was made. As I turned the engine over by hand (spark plugs removed to bleed compression), I heard a distinct clicking sound. Close inspection revealed that three springs had fractured inner coils. And get this: the lash setting was OK (0.020) despite having been run like this for who knows how long. I was lucky—the outer springs (and flat dampers) remained stout enough to control valve motion without piston-to-valve contact. **Lesson learned:** Valvespring failure isn't always obvious. The more radical your valvetrain, the more frequently you need to inspect/replace the springs. ☀



7

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ASK ANYTHING



A Fox Fairmont on Mopar leaf springs.

CHRYSLER LEAF SPRINGS UNDER A FOX FORD?

Steve Magnante; North Brookfield, MA: It's me, Steve Magnante—writing to myself, and all you faithful **Car Craft** readers, about a Fox-body Ford suspension problem I had, and solved. The car is a 1981 Ford Fairmont that I'm transforming into a streetable, altered-wheelbase Match Bash tribute. Think of it as Phil Bonner's 427 SOHC 1965 A/FX Falcon, but built with new-age components. Power comes from a Ford Performance DOHC 4.6 L crate engine inhaling through a Hilborn-esque eight-stack EFI from Australia's DC&O Components.

The stock MacPherson strut front suspension is long gone, replaced by a straight axle and parallel leaf springs with the axle centerline pulled forward 5 inches ahead of stock, and the front wheel openings relocated to match. There's a Tremec TKO 600 five-speed stick behind the new-age Cammer, and the entire interior has been gutted with a set of retro fiberglass buckets filling in for the stock bench.

My problem used to be that the stock Fox/Fairmont four-link rear suspension hopped violently if I power shifted. I'm not talking about a momentary shudder. Rather, the entire rear axle (a 1988 Mustang 8.8 with 3.73:1 gears) jumped up and down for as long as I kept my foot planted. I swore something was going to break, but somehow it all stayed together. Regardless, it was no way to live—or launch.

Before getting into my uncouth cure, it's important to say that I'm fully aware the Fox rear suspension has an excellent

track record and is capable of delivering clean launches well into the 9-second zone with the simple addition of bolt-on antihop bars and heavy-duty shocks. But in my case, there was a twist. As a Match Bash tribute, the lowered ride height applied to most street and strip Fox Mustangs (and the occasional Fairmont/Zephyr) is the *opposite* of the elevated ride height I was looking for.

Not only is a slammed suspension a no-no in mile-high Match Bash land for aesthetic reasons, it interfered with the 31-inch diameter of the Radir 15x10 pie-crust slicks I'm running under the back of the beast. To get some elevation, I initially swapped in a set of V8, A/C Fairmont coil springs, and this gave me an extra inch. Combined with the tippy-toes stance triggered by the elimination of 100-plus pounds of interior, heater, A/C, and carpet weight, the tall, wide retro slicks were bolted to the ends of a stock-width Fox Mustang 8.8 rear axle (with a pair of driver-side Bronco II 5-lug axleshafts inserted for the needed 5-lug 15x7 Torq Thrust-D rear wheels). Thanks to the 2½ inches of additional ride height, there was about ½ inch of clearance between the slicks and fender lips at rest. Not great, but encouraging.

Oh, I need to mention that the entire rear suspension and axle module was cut free from the Fairmont's floorpan and body, then slipped forward 11 inches to get the altered-wheelbase effect at the rear of the car. With the rear wheel openings stretched like "Dyno" Don Nicholson's 1965 427 SOHC Comet Cyclone,

the look was perfect. Knowing that the stock U-channel lower control arms are supposed to be rather flexible, I boxed them with welded strips of metal. The rear shocks were standard, heavy-duty, parts-store units. With a custom-length driveshaft connecting the Tremec to the 8.8, the car blew minds on the open road.

But getting back to the intense axle-hop, I snooped around and soon discovered the Fox's four-link geometry is very sensitive to changes in ride height of an upward nature. Though lowering is a step in the right direction, my efforts to increase ride height threw a bind into the relationship between the upper and lower control arms. Beyond that, I really needed another inch of fender-lip clearance to prevent tire sidewall scuffing on road bumps and jolts.

I toyed with the idea of adding length to the control arms or fabricating adjustable replacements in an effort to gain ride height while curing the insult to the instant center. Then I caught a glimpse of the Chrysler A-body Super Stock leaf springs under another car in my garage. Stone-axe reliable and very simple, they're legendary for their ability to make traction. But could I adapt them to the Fox chassis?

An hour of measurements revealed that they could be swapped in place with minimal hassle. The key was how the Chrysler leaf springs are set up to position the axle pin a third of the way back instead of half the way back, as with most comparable Ford and GM passenger-car leaf springs.

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Specifically, the front segment is 18.5 inches long while the rear segment is 37 inches long, with overall length (eye-to-eye) at 55.5 inches.

A measurement of the stock Fairmont framework (united, integral with floorpan) showed that I could use a standard Mopar Performance leaf-spring relocation kit to install a set of 1968 Hemi Dart-spec leaf springs directly in line with the Fairmont's forward framerails. As for the rear shackles, I welded a simple pair of 2x4 rectangular steel tubes beneath the trunk floor in line with the leaf-spring trajectory. Then, a set of riser blocks were welded in place to accept the rear shackles and give the necessary ride height.

Amazingly, the stock-width Fox Mustang 8.8 axle has a natural gap where the Mopar spring pads need to be welded on. There is no need to eliminate any of the stock Mustang lower control arm or shock-absorber mounting tabs. That said, I am planning on replacing the 8.8 with a slightly narrowed 9-inch some day for strength and to tuck the slicks inboard another inch per side for aesthetics.

Yes, there was plenty of measuring, cutting, and welding required to replace the Fairmont's stock four-link with what's essentially a 1968 Hemi Dart rear suspension (minus the pinion snubber). But the process was very basic and delivered the needed results. Though I haven't yet launched (or driven) the Funny Fairmont with its Chrysler-based rear suspension (I'm changing the EFI controls to Holley HP EFI), there's little doubt its hopping days are over.



No more axlehop and plenty of ride height.

HOODSCOOP ARGUMENT

Scott Bourget; Kent, WA: My friends and I have an ongoing argument about hood scoops. I say the whole buzz about mounting the hood scoop up high in the airstream is bunk. As long as there is a free path for outside air to get to the air-cleaner housing, the suction of the pistons will naturally pull in this denser air and the engine will make more power. Some of my friends agree, but others say the air will stall in the scoop and duct if it isn't pushed along by the airflow of the car moving through the atmosphere. For that, they say the scoop opening needs to sit way up above the hood skin. Who is right?

Steve Magnante: That's a very thoughtful question, Scott. Much of the discussion depends on whether the car is moving or at rest. Your supposition that a running engine creates a vacuum inside any ducting connecting its air-filter housing to the outside world is sound. Think of a police cruiser sitting on the side of the highway idling. With the crank-shaft turning at perhaps 700 rpm, the draught created inside any duct connected to the outside of the engine bay would hardly be noticeable. I doubt a piece of paper would even stick to the opening. But crank that engine up to 5,000 rpm—with the car still at rest—and you'd note a definite increase in the volume of ingested air and a discernable suction felt at the end of any inlet tube. Anybody who says there's no air movement inside a cold air tube when the car is stationary is misguided.

But lets put the car in motion, it's natural state most of the time the engine is running. With the crankshaft turning at 1,500 to 4,000 rpm on a cruise (depending on gears), any air drawn into the air cleaner by cylinder suction is going to be met by another force. That'd be the rush of air over, through, and around the car body as the wheels push it down the road. This is where the natural suction

caused by the moving pistons is merged with outside air entering any scoop opening that's present and connected to the engine.

If the air inlet is small and set at a 90-degree angle to the flow of air past the car, a minimal additional amount of outside air will meet the existing suction. But if the scoop opening is positioned so it faces directly into the onrushing air, the suction caused by the piston intake



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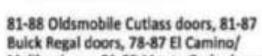
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stroke will be overtaken by the flow of air entering the tube at highway speed. The funny thing is, if you study enough cars in the junkyard, you'll see an example of each of the air-inlet systems I've discussed so far. Some seem utterly useless in their small size and tortuous hose routing. In particular, this is true of late-1970s U.S. cars with big V8s. But they must add something, or their designers wouldn't have bothered.

In the case of performance-oriented, muscle-car and aftermarket add-on air scoops, your friends have noticed that many are situated so their openings are set a couple of inches above the surface of the car body or hood. This shows that their designers were aware of the naturally occurring boundary layer of stagnant air that clings to the vertical and horizontal surfaces immediately behind the nose of the car as it pushes through the air while in motion. To grab a piece of this passing air, the scoop opening must be set apart from the body a few inches or more. However, if the scoop openings are placed too far above the hood skin, visibility obstruction quickly becomes a problem. Also, the double-edged issue of unwanted wind resistance begins to come into play with tall, wide scoop openings. Good examples of effective boundary layer hoodscoops were seen on muscle cars like the 1969 SC/Rambler, 1970 Challenger T/A, and Mustang Boss 429. Their scoops stood tall enough to divert some of the high-speed airflow into the air cleaner. Surprisingly less effective were the forward-facing Shaker hoodscoops used on certain 1969–1970 Mustangs and 1970–1971 Mopar E-bodies. They had the right idea, but sat too low against the hood to grab much air from above the boundary layer. The rearward-facing, Shaker-style hoodscoop of the 1970–1973 Pontiac Firebird was too far away from the windshield to take advantage of the tumbling, high-pressure airstream created at the base of the glass above the cowl. That's where the 1970–1972 Chevelle Cowl Induction hood-scoop (RPO ZL2) tried to play, but

the small opening of its vacuum-operated, pop-up door limited the effectiveness.

In the end, the best place to grab a breath of cool, dense, outside air is at the front of the car body. There's no boundary-layer effect to bar entry and the ram effect is engaged at any forward speed. But since the leading edge of the car body is also most susceptible to gulping foul-weather hazards such as snow and rain, few automakers have been brave enough to put their scoop openings there. Standout examples include the 1964 Ford Thunderbolt, which transformed the inboard headlamp openings into scoop openings to feed 5-inch hoses running into the carburetor box. Oldsmobile also mined the leading edge of the car body with its under-bumper W-30 kits of the 1966-1969 period. Most recently, Dodge has renewed interest in the free source of cool, outside air passing through the grille with its Air Catcher system, exclusive (so far) to the Challenger SRT Hellcat. By placing a hollow tube in the center of the driver-side, inboard marker lamp position, the 707hp Hellcat can breathe cooler, denser air than what's floating around under the hood. And if you thought Hellcat's trio of hoodscoops are there for easier breathing, think again. They're actually air extractors to vent heated discharge air from the intercoolers. Get this, they're aerodynamically tuned to increase downforce at speeds above 150 mph. That's because the air exiting their screened vents collides with the base of the windshield to add downforce! We could go on all day about airflow and airflow management.

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Power & Precision



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Inside the gorgeous 'Vette's potent 427 c.i.d. LS3 engine built by Mast Motorsports you'll find a wide array of ARP fasteners employed to ensure optimum performance and reliability. Goldman also used them for various other functions. Says Mike "I really love the 12-point design as it compliments many components."

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THIS GUY'S GARAGE

The 1983 Hurst Olds signaled a tepid return to performance in the early 1980s. It was unquestionably a great-looking car, with its black-over-silver paint scheme, but its 307-cid engine was rated at only 180 hp. Back then, however, it was performance that had been offered for more than a decade. Walz's car is also fitted with the T-top option.



Walz bought this 1985 Chevy 4x4 back in 1987. In the early 1990s, he lifted it and had the custom paintwork done. It rides on 39-inch-tall tires and under the hood is a blower-topped 355 small-block.



Walz stalked this 1984 Hurst Olds online for six months, waiting out the seller's too-high asking price. It came from Omaha, Nebraska, with 64,000 miles and is one of 3,500 built.

The literal and figurative center of the collection is this 1985 Monte Carlo SS that's had its original 180hp 305/200-4R combo swapped for a Chevrolet Performance Connect & Cruise crate powertrain featuring the LS376 (525hp) engine and 4L70-E transmission. It also wears 17-inch versions of the N90 aluminum wheel from Year One. There are tons of other great details on the car, including dark blue paint and later-style graphics.

GEORGE WALZ / Onsted, MI

Like most of us, George Walz has an affinity for all cars and a passion for specific models. For him, it's GM's G-bodies—the cars of the 1980s that represented the General's final stand with traditional, body-on-frame, rear-wheel-drive coupes. It's a bond that's not hard to understand. Each division interpreted the architecture a bit differently, but all shared generally lithe, well-proportioned designs that looked great in their respective muscle-car-revival liveries. Walz's cars are housed in a 2,600-square-foot "showroom" that's attached to a 2,400-square-foot workshop. The showroom is nicely finished with recessed lighting and adorned with neon signs picked out by his wife. It's an enviable environment for the self-taught wrench-turner, who supports his habit working as driver and dispatcher for a small trucking company.

By Barry Kluczyk / Photo: Barry Kluczyk

A 1981 Corvette wasn't on Walz's must-have list, but when he found it at a dealership in Branson, Missouri, while traveling there for his sister's wedding, he ended up buying it and driving it home. The rare, two-tone car was one of the earliest built at the Bowling Green factory, and it has only 23,000 original miles.

The other Monte Carlo SS in the collection is one Walz has owned for 20 years. He wanted one so badly, he financed it with credit cards. Beats running up the balance on junk like food and clothes.

Pontiac's representation in the collection comes in the form of the rare 1986 Grand Prix 2+2. It was the brand's NASCAR-intended counter to the Monte Carlo SS and bullet-shaped Thunderbird. Only 1,138 were built, and Walz bought this one five years ago from the original owner.



A G-body collection wouldn't be complete without a Grand National, and this 1987 example has 89,400 miles on the clock and no modifications. Walz bought it at an auction in Indiana after lustng after them—like all of us—for more than 20 years.

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SUPER COUPON

PITTSBURGH
4" MAGNETIC PARTS HOLDER

SAVE
66%

LOT 62535
90566 shown

\$1.99
REG. PRICE \$5.99



SUPER COUPON

20 TON
SHOP PRESS



• Pair of Arbor
Plates Included

SAVE
\$145

LOT 32879
60603 shown

\$154.99
REG. PRICE \$299.99

19450507

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SUPER COUPON

CENTRALPNEUMATIC
HIGH SPEED METAL SAW

LOT 60568/62541/91753 shown

SAVE
61%

\$12.99
REG. PRICE \$33.99

19486197

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SUPER COUPON

72" x 80"
MOVER'S BLANKET

HamMaster
LOT 66537 shown
69505/62418

SAVE
66%

\$5.99
REG. PRICE \$17.99

19477395

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SUPER COUPON

PITTSBURGH
6 TON HEAVY DUTY
STEEL JACK STANDS

LOT 69596
61197/62393
38847 shown

SAVE
50%

\$39.99
REG. PRICE \$79.99

19415722

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SUPER COUPON

**20%
OFF**

ANY
SINGLE
ITEM

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19434821

WOW SUPER COUPON

4000 PEAK/
3200 RUNNING WATTS
6.5 HP (212 CC)
GAS GENERATORS

PREDATOR
GENERATORS

SUPER QUIET

LOT 68528/69729/69676 shown



SAVE
\$200

\$299.99
REG. PRICE
\$499.99

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SUPER COUPON

12' SLIDING COMPOUND
DOUBLE-BEVEL MITER SAW
WITH LASER GUIDE

CHICAGO ELECTRIC

NEW

LOT 69684 shown
61776/61969
61970

SAVE
OVER
\$165

\$134.33
\$104.99

REG. PRICE \$299.99

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SUPER COUPON

3/8" x 50 FT.
HEAVY DUTY PREMIUM
RUBBER AIR HOSE

LOT 61939
62250/69580 shown

SAVE
36%

\$18.99

REG. PRICE \$29.99

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fraction of the price because
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WOW SUPER COUPON

26", 4 DRAWER TOOL CART

US GENERAL

★ WINNER ★
Truckin' Magazine

LOT 95569 shown
61634/61952

• 580 lb.
Capacity

**SAVE
\$180**

\$99.99

REG. PRICE
\$279.99

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SUPER COUPON

9 PIECE FULLY POLISHED
COMBINATION WRENCH SETS

SAE

LOT 69043
42304 shown

Metric

LOT 42305
69044 shown

PITTSBURGH

SAVE
62%

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CHOICE!
\$5.99
\$8.99
REG. PRICE
\$15.99

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SUPER COUPON

VEHICLE POSITIONING
WHEEL DOLLY

LOT 67287/62234
61917 shown



• 1250 lb.
Capacity

**SAVE
\$55**

\$64.99

REG. PRICE \$119.99

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SUPER COUPON

3 PIECE TITANIUM
NITRIDE COATED
HIGH SPEED STEEL
STEP DRILLS

LOT 91616 shown
69087/60379



• Drill 28
Hole Sizes

**SAVE
55%**

\$8.99

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SUPER COUPON

10 FT. x 10 FT.
POPUP CANOPY

LOT 62513/62384
62990/62897
69456 shown

**SAVE
\$40**

\$59.99

REG. PRICE \$99.99

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SUPER COUPON

12 VOLT 10/250 AMP
BATTERY CHARGER/
ENGINE STARTER

CEN-TECH

LOT 66783/60581/62334
60653 shown

**SAVE
62%**

\$29.99

REG. PRICE
\$79.99

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SUPER COUPON

40 LB. CAPACITY
FLOOR BLAST
CABINET

LOT 62144
68893 shown



\$179.99

REG. PRICE \$299.99

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SUPER COUPON

12 VOLT 10/250 AMP
BATTERY CHARGER/
ENGINE STARTER

CEN-TECH

LOT 66783/60581/62334
60653 shown

**SAVE
62%**

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REG. PRICE
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WOW

SUPER COUPON

Customer Rating

RAPID PUMP® 3 TON LOW PROFILE HEAVY DUTY STEEL FLOOR JACK

- Weighs 77 lbs.

LOT 68049/62326
62670/61282
61253 shown

\$84.99
~~\$107.99~~
REG. PRICE
\$169.99

PITTSBURGH

STEEL

FLOOR JACK

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THE QUEST FOR PERFECT PAINT

Perfect Is Impossible, But You Can Get Close— We Show You How

By Kevin Tetz / Photos: Wes Allison and Kevin Tetz

→ Perfect paint is an illusion. It doesn't exist—at least, not in the real world. But it's a goal we can strive for and improve our work in the process. The reality is that spraying the paint is *not* the most difficult or the most time-consuming part of the job. I like to say that spraying is the reward we get for doing all the hard work that goes into the prep work. Yes, you need skill to spray paint, but it's a quick study compared to bodywork, blocking, and surface refinement. The masters will tell you there's no trade out for time investment, and the more you put in, the more your paint job will

give back. To think that we could stuff 30 years of experience into a magazine article that shows you everything you need to know to get perfect paint is silly, but what we can and will show you are some great techniques that will send you on your way to improving your skills. The rest is up to you.

ZedSled, our 1978 Z28, was always meant to look good, but has to stay on a reasonable budget. Not many people have a six-figure budget for building a car, so we set out to see if we can build the car at a fraction of that cost using salvage-yard parts, cost-effective materials from Eastwood, and

old-fashioned sweat equity. The build doesn't end with the finished paint job, and there's still a ton more work to do, but we're getting closer to meeting that goal, and we're proud of the progress so far. The message we want to share is that painting is not a talent, but rather a skill that can be learned, and preparation is king. If you invest in learning paint-and-body skills on your own, the only check you have to write is for materials and paint. There's always going to be costs involved with restoring or improving our vehicles, but these skills can actually pay you back!





ZedSled had been painted once over the original coat, so it wasn't too horrible stripping it to metal with soda and mechanical sanders. The process revealed a much more corroded body than we thought, but that's typical.



We replaced the rotten metal with the help of National Parts Depot and bathed the raw sheetmetal in Eastwood's 1:1 black epoxy primer to keep it from rusting again.



Polyester primer/surface is spray filler; it's the last stage of bodywork in most custom shops and builds like crazy. Spray three coats of poly and you've got more than enough material to straighten out your panels with a long board.



I prefer to do my bodywork on top of epoxy so there's maximum protection against flash-rusting. We used Eastwood fillers to fix the imperfections in the 37-year-old sheetmetal.



The firewall was smoothed and plated where the ugly wrinkle typically sits above the trans tunnel. After fillers, poly surfacer will help clean up the firewall and smooth the OE warts.



The first round of poly is three coats thick, approximately 12 mils of primer (most will end up in powder on the floor).



A huge 2.0 fluid tip in the Concours Pro gun is used to spray the poly surfacer. Remember, this is spray filler—it's thick and doesn't flow quickly. It needs to be sprayed through a huge orifice.

PROJECT CAR



The first round of blocking was with 120-grit, which is very aggressive and levels the primer fast.



Sanding blocks are a must, as are soft sanders that are designed to fit the shapes of your body contours and help refine the surface of your panels.



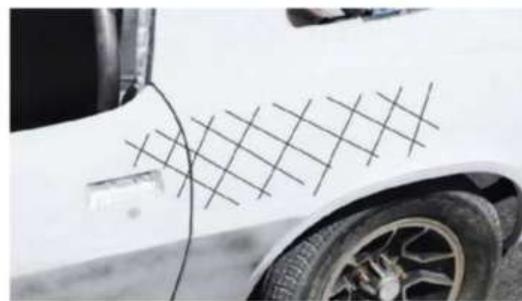
A guidecoat helps "read" the surface while blocking and is a necessity for flat bodywork. It's a visual aid and lets you know when you've leveled the surface from the top down. Eastwood's spray guidecoat is *not* paint and won't gum up your paper.



After a guidecoat, round two of blocking (this time with 180-grit) will further refine the shape and straighten the panels.



Between sessions of blocking and priming, the surface must be perfectly clean. Eastwood's Pre Painting Prep is used to wipe the panels before additional coats of primer.



When you're blocking, think about chopping wood, using a cross-hatch pattern to remove more primer faster. A cross pattern also keeps your surface level.



After blowing off the blocking dust, the Sled gets wiped down once more to prep for the next round of primer.

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PROJECT CAR



Eastwood's 2K Urethane primer comes in white, tan, and black—black being the perfect color for ZedSled since it's getting a black topcoat.



Our Concours Pro 2 gun comes with a 1.3, 1.7, and 2.0 fluid tip, which makes it a versatile gun that's ready for all the coatings we need to spray.



3M's PPS cup-liner system saves time, money, and paint thinner, making it an environmentally friendly and cost-effective addition to our paint shop.



These $\frac{3}{8}$ -inch ID air-hose fittings are a necessity in any paint shop. High-volume, low-pressure (HVLP) guns depend on air volume (cfm), not pressure, and $\frac{3}{8}$ fittings are mandatory for optimal air volume and proper atomization of any high solids product.



All the panels get three flatcoats of Eastwood 2K urethane primer.



After it's dry, the satin look of the panels makes us want to do a tough-looking, rat-rod second-gen. Note the stock extractors mounted from the inside of the fender.



The firewall is very visible and gets the same treatment as the exterior panels on this build. At this stage, it's not much more work to commit to smoothing a few more panels, and it will pay off big time when the car is done.

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skinned knuckles
worn shop manuals
and a whole lot of father-son time

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PROJECT CAR



F-body guys know the struggles of the flimsy bumper covers on the 1978-1981 Camaros, and a flex agent helps keep the high-build primer from cracking and flaking under blocking and shaping. It gets mixed 10 percent by volume.



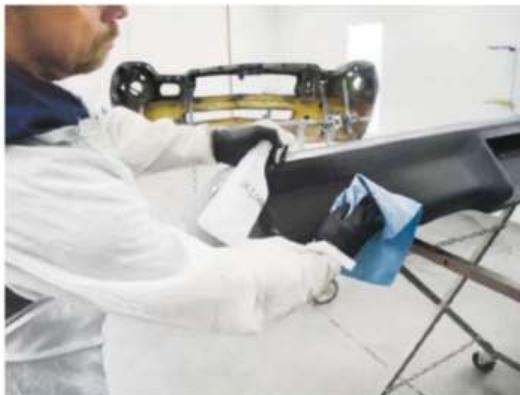
The front and rear fascia get three coats of the 2K primer (with flex) and are blocked with 180-, 220-, and final sanded with 320-grit—just like the steel panels—and reprimed, if necessary.



A dual-action sander is a great tool when used correctly, and when you sand *only* the flat panels, you can be very efficient in prepping the surfaces for paint. We're using 320-grit for final sanding.



Using 320-grit on a soft sander helps properly block the curved areas. Fingers cause ripples that can show through the paint; sanders and blocks are flatter than our fingers.



Cleaning the parts is done in several stages, starting with an alcohol wipe, which acts as an anti-static and keeps parts cleaner in the paint booth.



With the panels mounted on stands, they can be thoroughly washed, minimizing the dust that can be blown back into the paint in the booth. Clean panels are absolutely necessary, and dishwashing soap is the best thing to use because of its high PH value.



An aerosol glass cleaner offers another layer of clean, taking care of organic contamination.

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PROJECT CAR



If you don't have a paint shaker, get your jobber to shake the paint for you or spend lots of time stirring. Paint separates in the can and needs to be agitated. We're using Eastwood's Boulevard Black as the topcoat color for ZedSled.



The last step before spraying paint is a wipe-down with a tack rag. This picks up any airborne dust that may have fallen onto the panels.



The base color gets a minimum of two coats, though you typically need more with lighter colors. Dark colors like black have strong pigments and covers faster.



Using the same Concours Pro gun with the same 1.3 fluid tip as used to spray the base color, every panel gets three full wet coats of clear.



After 30 minutes waiting after the last coat, the panels get another tack-rag session before clear.

The gloss is brilliant, and we're feeling euphoric to finally see new color on these old panels!



Eastwood's Premium Show Clear is a 4:1 mix, with the option of additional reducer for better flow.

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Motor Assembly Grease



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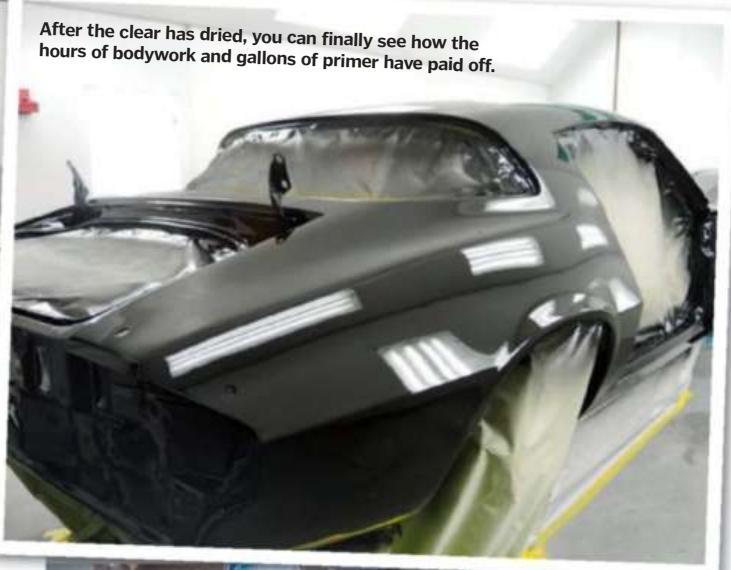
for store locations
CARQUEST.com



PROJECT CAR



Masking any car is easier with no doors, windows, or trim, but the best benefit is that doing so eliminates tape lines at panel breaks.



After the clear has dried, you can finally see how the hours of bodywork and gallons of primer have paid off.



Here's an example of why to spray a car "exploded" (disassembled). The jambs, which are usually an afterthought, get the same slick finish as the rest of the body. These details will make you proud.



Wiping down the panels between sanding sessions lets you check your progress. We're using a spray glass cleaner to lift the dust off the panel.



The next session is 1,500-grit, which further refines the surface and helps remove texture from the clear, after the 1,000 has removed the surface dust.



It took about five hours to spray the car from start to finish, and there are small particles that have fallen into the paint between coats and while spraying. Surface correction is the next step in the job and starts with 1,000-grit on a sander, working only the flat panels with the machine and using a very light touch, stopping after the surface is broken and dull.



Eastwood has an alternative to machine-sanding with small multi-packs of ultrafine paper, including TRIZACT 3,000-grit for the final stage, which makes buffing much easier.



Using slightly soapy water with the 3,000-grit TRIZACT, everything gets sanded one last time, making four passes over every sanded panel.

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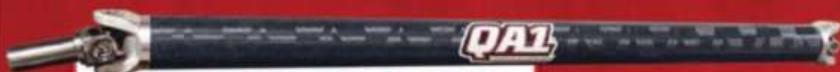
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The first step is to use a wool pad at 1,200 rpm. This is quite coarse, but it removes the sanding scratches and preps for the next refinement stage.



The blue pad is foam and finer than the wool, but still aggressive. This stage cleans the "haze" off the surface and further refines the gloss and distinctness of image reflection (DOI).



Glass cleaner is used to remove haze and dust, and we used it to check the surface to see if we're ready for the next pad and also to remove contamination before buffing again. We do this between every pad change.

TIME COMMITMENT

Here's the time breakdown in hours for our labor on this job so far:

Rust repair	35
Body/Filler work	250
Priming and blocking (two polyester sessions, two urethane sessions)	80
Masking and paint	22
Sanding and buffering	18
TOTAL	405



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ZEDSLED PAINT JOB COSTS

A common and valid question is, "how much does it cost to paint a car yourself?" The answer varies a lot, and the price depends not only on the color you choose but also on the condition of the vehicle that you're resurrecting. Our Camaro was a turd in the nicest possible way—it was complete, but almost too far gone. Once we got good metal welded back in, we started adding up receipts. Here's the rundown of what we paid for the materials it took to shoot ZedSled. We didn't factor in tools, and there may have also been a few small-ticket items that fell through the cracks (razor blades, wiping towels, band aids, and so on) but the list is honest, and pretty darn close to what we actually spent.

PARTS

DESCRIPTION	PN	SOURCE	PRICE
1 to 1 sealer (black)	51128ZP	Eastwood	\$94.00
Polyester Primer surfacer (2 gallons)	13523ZP	Eastwood	159.98
2K urethane primer surface (1 gallon, black)	14007ZP	Eastwood	69.99
Boulevard Black base color (1 gallon)	13566ZP	Eastwood	169.99
Premium Show clear (2 gallons)	15351ZP	Eastwood	399.98
Pre-painting Prep (2 cans)	11949Z	Eastwood	14.00
Guidecoat (2 cans)	12416Z	Eastwood	20.00
Sandpaper (misc. sheets)	NA	Eastwood	120.00
Masking supplies (est.)	NA	Eastwood	60.00
Liquid ice buffering system	25266	Eastwood	109.00
TOTAL			\$1,216.94



After cleaning again, the last buffering step is the white foam pad, which has a velvety feel. The same compound is used for each step, using chemistry to enhance and build off each previous step.



A clean microfiber cloth gets any residue off the panels and lets you do a final check at the same time.

The Norton Liquid Ice system uses three pads and one single compound that breaks down with use. It works beautifully to bring the sanded panels back to full gloss. ■



→SOURCES

Eastwood; 800/343-9353;

Eastwood.com

National Parts Depot; NPD.com

Paintucation Instructional DVDs;

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FIVE CUSTOM BODY MODS YOU CAN DO ON THE CHEAP

Tips From the Experts

By Kevin Tetz / Photos: Kevin Tetz

→ Sometimes the simplest tricks are the coolest! We wanted to show you some straightforward but effective tweaks that can make a big impact on your project without taking weeks and weeks of custom fab work to complete. The Greenings, Ring Brothers, Roadster Shop, and other custom builders know the secret of simple

elegance: they utilize tasty and clean mods in nearly every build. You can do similar work at home with a few well-chosen modifications that will separate your build from the crowd. Any custom work takes time, but it's nice to know there are simple solutions that can be cost-effective, functional, and very cool.



PRECISION PANEL GAPS



1

1. Perfect panels gaps are achievable and a great touch to any style vehicle. This is $\frac{1}{8}$ -inch square stock available at most metal supply stores. After the door is fit to the vehicle, the square rod is tacked to the offending gaps.



2

2. Here you can see the result: a perfect edge that's totally straight, eliminating the need for plastic fillers to close and tighten gaps. The square stock will be fully stitch-welded to the door once complete.

SMOOTH FIREWALL

4. The firewalls on most Camaros and Firebirds are ugly, but it doesn't take much work to clean it up.

5. A small scrap of 20-gauge sheetmetal and MIG welding up about 35 holes is inexpensive and much less time intensive than gutting and flat-plating the entire firewall.

6. Here you can see the outstanding results of a little welding, filler work, blocking, and satin black paint. The DSE Filler plate looks clean and really helps the overall appearance.



4



5



6



CUSTOM FENDER VENTS

7. Project ZedSled, our 1978 Camaro Z28, has all the disco-goodies, including fender vents, which are stock on 1978 and 79 Z28s. They are surprisingly functional as heat extractors, but their tacked-on appearance breaks up the flow of the panel.

8. By cutting off the studs, filling the mounting holes in the fender, and creating mounting tabs on strips, you can mount the vents in from the inside of the fender. Thanks to KIWI Customs for the fab work!

9. The finished product under primer looks totally custom, but is all OEM parts with a little bodywork thrown in to finesse and finish.



FLUSH DOOR HANDLES

10. Country music star James Otto is building a Pro Touring 1966 Chevrolet C10 pickup. Among the custom tweaks are these Kindig door handles that still retain a little vintage character, but lift the look to a custom level.

11. Step one is removing the recessed pocket of the factory handle

12. Flat-plating the new opening with 20-gauge sheetmetal gives you room for the included template to be traced and cut out to fit the handle.

13. The handles have their own lever mechanism and are welded in flush to the outer door skin for a very clean, custom look without the electric door poppers typically used with shaved door handles.



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HOOD HEAT EXTRACTORS

14. Heat extractors are nothing new in high-performance vehicles, and builder Brent Buttrey got creative with James Otto's C10 to create serious, race-inspired styling that's functional and simple to create.

15. After a cardboard template gets transferred onto 20-gauge metal, the flat stock is trimmed out and bent to the proper shape.

16. The engine compartment of these trucks is cavernous, even with a build 6.0 LQ4, so there's plenty of room for the extractor to scoop air directly from the radiator core making this mod functional and cool. ☀



14



15



16

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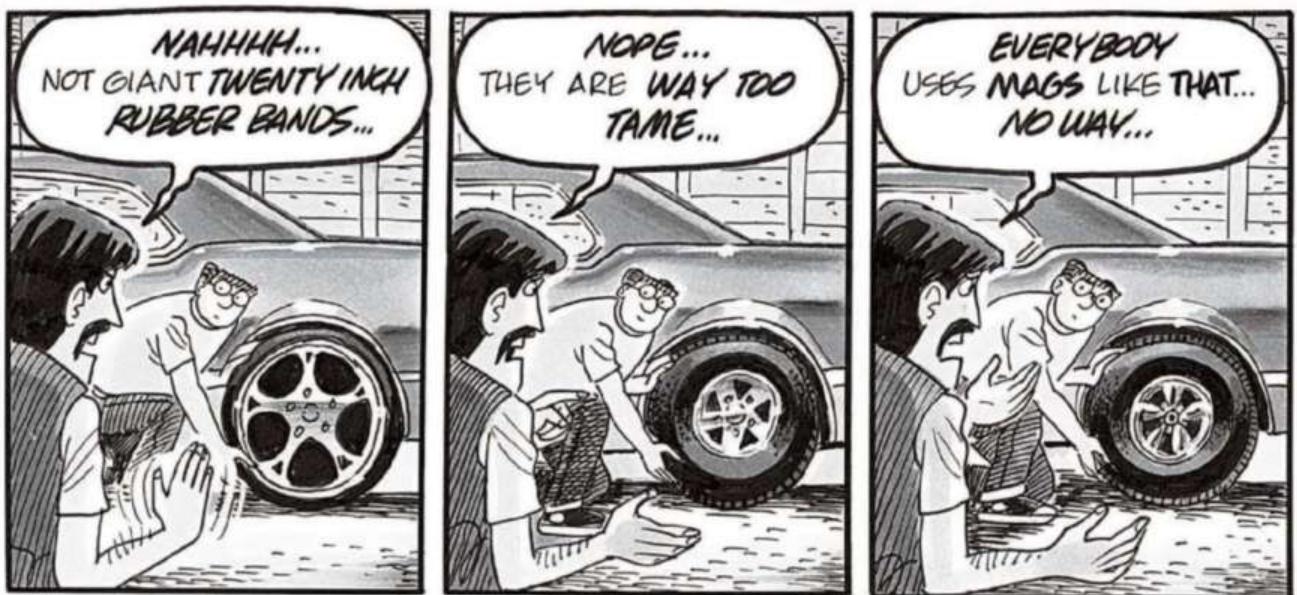


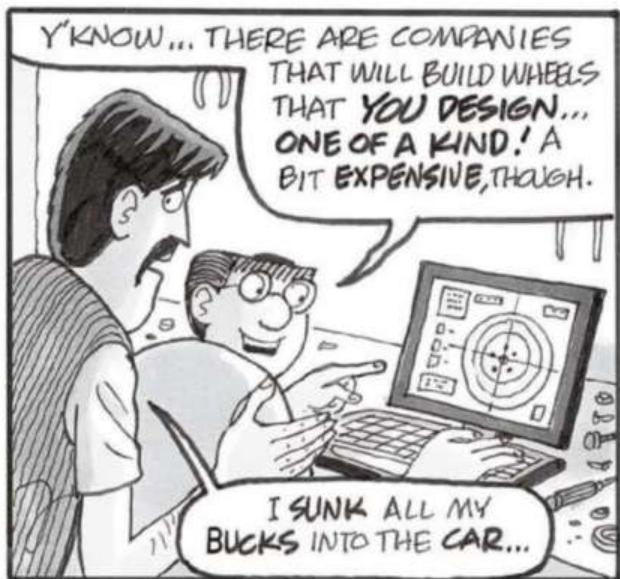
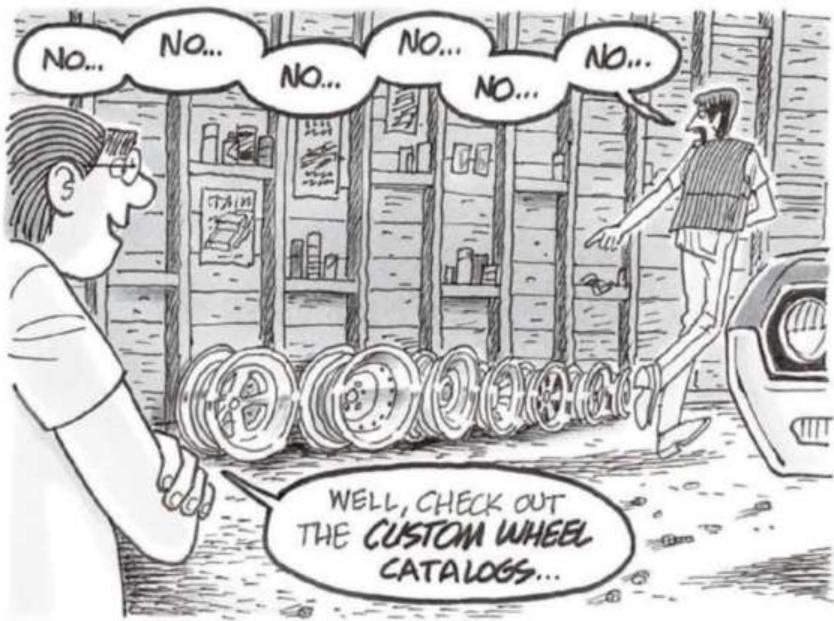
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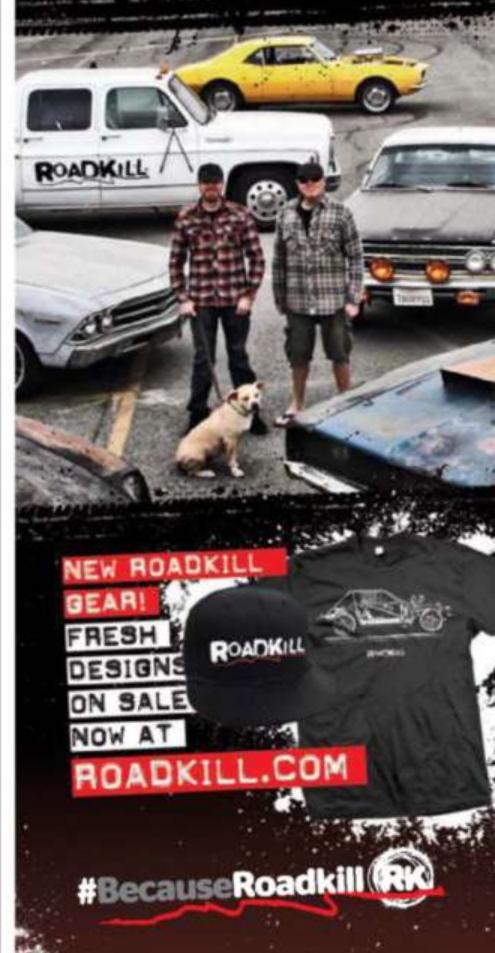
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By Jason Sands / Photos: Wes Allison and John McGann

MASTY

2,000 HP in a Rolling Work of Art

With a name like Dan Novara, building a Nova came naturally to the guy. I mean, he couldn't really drive anything else, could he? Still, the 1969 Nova that Dan built is in a class by itself, both in execution and power. While we've all heard the old adage that there's no replacement for displacement, there's also the new trend of forced induction. Dan decided he'd better have both just in case, and

his big-block with twin 88mm turbos can make upward of 2,000 hp, depending on boost levels. This type of commitment to horsepower was needed in order for Dan to be successful, as he would be racing his car in the ultra-competitive world of X275 drag-radial racing.

The heart of Dan's Nova is a 516ci engine based on a Dart Big M block, and in perusing through the Nova's parts list, it's



NOVA

clear that he didn't cut any corners. When it came to the air and fueling systems that needed to support 2,000 hp, he went with the best money could buy: pieces from Aeromotive, Precision Turbo, Moran Motorsports, and Big Stuff. Since Dan runs M1 Methanol, an intercooler wasn't needed for his combination, and overheating issues are virtually nonexistent when street driving. In case Dan ever wants to turn

it up, the twin Pro Mod 88s from Precision Turbo can support more than 3,000 hp. They're currently set at 30 psi of boost and tuned by Eric Dillard from Pro Line Racing Engines. The last thing anyone wants is to melt a brand-new engine combination into a chunk of molten metal by being way off on the tune, so lots of time was spent on the dyno getting everything just right.



With an engine this wild, you might expect the Nova's frame to be all tubs and tubes, but Dan wanted to maintain the car's street feel, so there's a surprising amount of factory pieces. The framerails all the way to the rear are actually stock, although they have been heavily massaged and tied together with a chromoly 25.5-spec cage from Mattheis Race Cars. Safety equipment is also incorporated throughout the car, with a Simpson harness, window net, and twin fire-suppression systems.

With such a small tire, getting the power to the ground can be quite a chore, so Dan took every step necessary to ensure his Nova could get down the track on a mere 275-sized radial. He installed traction control, went with a Davis Technologies Bump Box to keep up on boost at the line, and installed a Trans Specialties 1.58 First gear Powerglide with a fairly loose 5,400-rpm stall converter.

After going from an F2 Procharger, to a 14-71 on methanol, to twin 88s, Dan is finally satisfied with his existing setup and reports that it's a whole lot faster than the Procharger—and a lot more street-friendly than the big Littlefield. While he hasn't taken the Nova to the track yet, the car went 5.21 in the eighth-mile (with a 1.21 60-foot time) with the Procharger, so high-4s isn't out of the question with the new turbo setup in the 3,050-pound car. When he's not at the dragstrip, Dan can be found cruising to local shows, where he has gathered a number of First Place trophies. We're not sure if Dan will ever actually be finished tweaking his rolling masterpiece, but what he's done so far with both the car's looks and performance is simply incredible.

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TECH NOTES

Who: Dan Novara

What: 1969 Nova

Where: St. Louis, MO

Long-Block: With a dyno-proven 2,000 hp at 7,000 rpm, we seriously want Dan's twin-turbo big-block. The 516-inch Dart Big M-based block has splayed billet main caps, has been O-ringed, with bronze 0.937 lifter bushings installed. A Lunati 4340 crank riding on Clevite bearings swings a set of BME rods, which are connected to trick, double-coated 9.6:1 Diamond pistons with Hellfire rings. Valve actuation comes courtesy of a Bullet solid roller cam with a 4-7 firing order swap. Duration on the intake side is 277 degrees at 0.050, with 282 on the exhaust. Lift is 0.788-inch on the intake, 0.765-inch exhaust, with a 116-degree lobe-separation angle. Driven with a Jesel belt-drive, the cam bumps Crower lifters into custom taper Smith Brothers pushrods, which lift 2.35-inch and 1.90-inch intake and exhaust valves located in massaged AFR 385cc heads. Sealing is provided by a SCE copper gasket that's held in place with ARP studs.

Fuel and Air: Dan's Nova has so many engine mods that we had to separate his induction parts into a different category. For fuel, a rear-mounted and cable-driven Aeromotive Atomic fuel pump sends M1 Methanol up to eight Moran Billet Atomizer injectors that flow a whopping 550 lb/min of fuel. On the airflow side, there's an Accufab 105mm throttle-body, a custom Matheis sheetmetal intake, and headers to mount the turbos. Although he initially was going to go with 72mm turbos, Dan stepped up to twin 88mm Precision Pro Mod Gen 2s with billet wheels at the last minute, and reports he's glad he did.

Ignition: It takes a lot of juice to light off 2,000 hp worth of fuel, so Dan

went straight to the MSD catalog and ordered the biggest and best they had to offer. That meant an MSD beltdrive distributor, which sends power to a Digital 8 box, through a MSD HVC II coil and 8.5mm Super Conductor wires. The only non-MSD parts are the NGK 5671-10 spark plugs, which ignite the methanol.

Electronics: Controlling all the mechanical mayhem is a BigStuff3 computer, which features DAI and DAE upgrades for data acquisition, the SR2 option for traction control, an NTK wideband O₂ system for methanol friendliness, and a CAN VNET that allows for a bunch of cool display options. The system is tuned by Eric Dillard from Pro Line, who Dan mentioned about four times in his spec sheet, so we're guessing he did a pretty good job.

Transmission: Getting a powerful car out of the hole on a small tire is all about power management, which is why Dan's transmission is set up to leave the line with as little drama as possible. The Powerglide transmission was built by Trans Specialties and features a 1.58:1 low gear and a 5,400-rpm stall speed Precision Torque Converter.

Chassis: There's a surprising amount of Nova left in Dan's ride, including the original framrails. The rear frame has been notched, however, and a full 25.5-spec chromoly cage from Matheis Race Cars was added.

Suspension: The Chevy's front suspension is from Smith Racecraft and features spindles with a 2-inch drop. Out back, a ladder-bar suspension built



by Matheis keeps the tires glued to the ground. Santhuff springs and shocks can be found at all four corners.

Rearend: The rear is a stout Matheis 9-inch rear built around a Pro Mod case, with eighth-mile-friendly 4.11 gears from Strange Engineering, and 40-spline axles also from Strange.

Brakes: Stopping power was dramatically improved with Strange brakes on all four corners. The rear brakes have the added feature of dual calipers to help stage the car without pushing through the beams.

Wheels/Tires: Front wheels are 15x3.5-inch Weld Vs, which are covered by 26x4.5x15 Mickey Thompson frontrunner tires. Out back, 15x13-inch Welds mount a pair of Mickey Thompson 275/60/15 drag radials.

Interior and Paint: Although the interior and paint may often take a back seat to absurd power, it's part of the reason Dan's Nova gets the attention it does. The Nova's interior was created by The Top Shop, while Kullin Schoeffel, "Easy Ed" and Scott Lowery, and Paul's Paint and Body performed the chassis and cage painting, skull graphics, and custom paint blending, respectively.

Thanks To: At the top of Dan's thank-you list was his wife, Pamela, but he was also quick to mention a good dozen other people. Building a car of this caliber doesn't come without help and advice from friends, who all pitched in to make the Nova what it is today. ■

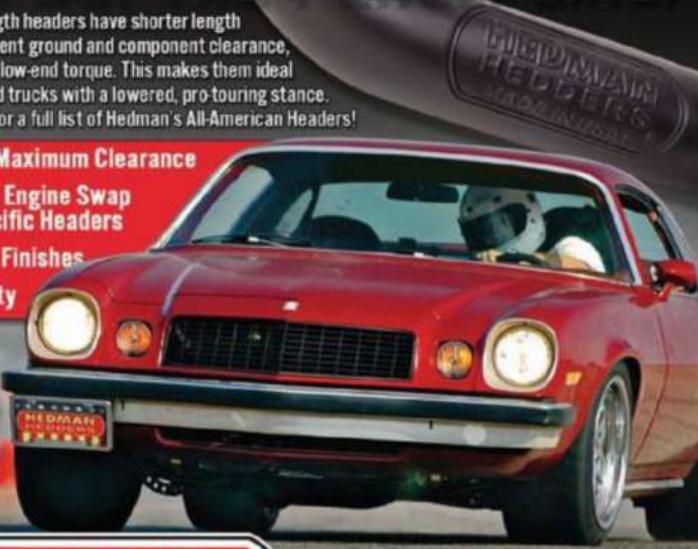


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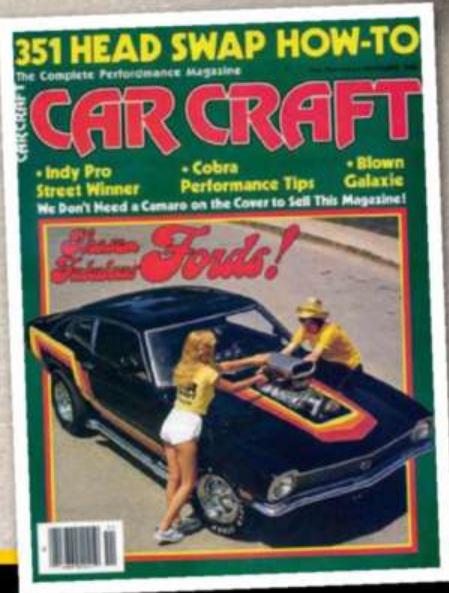
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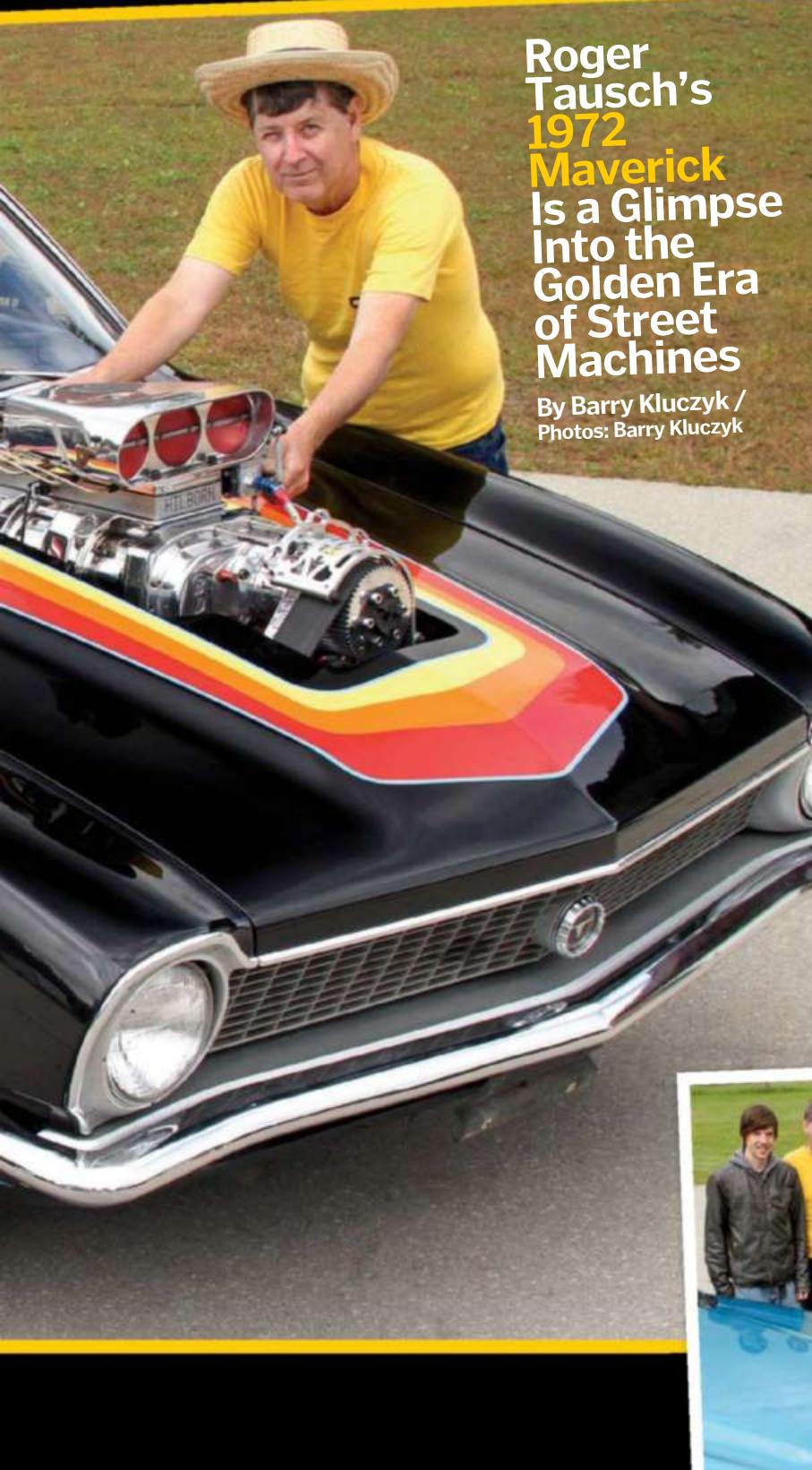


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PRO STREET TIME



MACHINE



Roger Tausch's 1972 Maverick Is a Glimpse Into the Golden Era of Street Machines

By Barry Kluczyk /
Photos: Barry Kluczyk

When Roger Tausch's blown 1972 Maverick rumbled through the Indiana State Fairgrounds 35 years ago during the Street Machine Nationals, it caused a stir among fellow street-machine enthusiasts and the **Car Craft** staff. Most blower cars at the time were Chevys and even fewer of the hot Fords were non-Mustangs. Editor Jon Asher directed the staff: "Find that blown, black Maverick," with further instructions that he had dibs on the photo shoot. When he finally got to the car, it was set up as an apparent cover shot that included a comely model in very short shorts. However, at a time when the magazine was sarcastically called "Camaro Craft" for a perceived editorial bias, the powers higher up the publishing ladder apparently balked at putting a black Maverick on the cover.

Roger's car appeared in the Nov. 1980 issue of **Car Craft**, which actually hosted a couple of Mustangs on the

cover, but his car led a special section of Ford street machines that featured a unique second cover image on page 53. The article included a non-too-subtle jab at the publishing company brass with a sub-headline that read:

"We Don't Need a Camaro on the Cover to Sell This Magazine!"

It was a fantastic debut for Roger and his 6-71-blown, 302-powered Maverick, which would grace the pages of several other magazines in the following few years, but not *Hot Rod*. He was recovering from a serious illness hours before the **Car Craft** shoot, and it was all he could do to participate in it. *Hot Rod* staffer





Marlan Davis had also contacted him, leaving meeting instructions on his business card. In the days before cell phones, the connection was never made, and **Car Craft** got the exclusive on the car. "I still have the *Hot Rod* guy's business card with the meeting instructions on it," Roger says. "It didn't work out, but I was really thrilled to have the car in **Car Craft**."

That Roger kept the business card isn't surprising. He's one of those guys who keeps everything. His machine/engine shop in the tiny burg of St. Charles, Michigan, is a timeline of automotive accomplishments; the walls are plastered with old photos and the corners are crowded with trophies and other mementos. Likewise, his supercharged Maverick is a virtual time machine of the street-machine era's golden age. It is essentially unchanged from its appearance in these pages 35 years ago, apart from a narrowed rear end and the change from carburetion to fuel injection. The tubbed rear end came shortly after the feature in **Car Craft** and followed the wildly popular Pro Street trend that took hold at the time. Roger and best friend Bob Gagne did the work themselves without harming the dazzling black paintwork and backyard-painted graphics.

The injection system is a more recent addition, however. Roger added it only a couple of years ago to fulfill his decades-long affinity for the look of a bug-catcher-topped, mechanical-injection setup. "We used to run a 1968 Dodge Funny Car and I always loved the look of those engines," he says. It was the blower, however, that kicked off Roger's street-machine legacy. His father bought the brand-new Maverick for him in high school. It was already wearing a tricked-out dealer package dubbed the Mod Maverick, which included wide rear rubber and side pipes. What didn't change was the anemic 302-2V engine and three-speed transmission. "I couldn't really beat anything on the street, so in 1976, my father and I went to Chicago to visit Dyers



Blowers," Roger says. "I bolted the blower onto the stock engine and started cleaning house. There weren't any other blower cars around in my area, so it really made a big impression."

That impression has lasted for about 40 years, and the Maverick is inextricably linked to its one and only owner. "People just know it around here as 'the car,'" Roger says. "I've had a lot of fun with it over the years. And it's a good reminder of my father, who at first was dead-set against me cutting it up, but was thrilled to ride around the Indy speedway during the Street Machine Nationals in it, and he was the first at the newsstand to pick up magazines when there was a story on it."

Roger's legacy is kicking in with the next generation, too, as his son, Max, works with him at the shop and has turned into a first-rate crankshaft turner. He's also built a lightning-quick, supercharged and nitrous-injected SN95 Mustang.

By the way, Roger's pioneering Pro Street Maverick was never a tubbed poseur or "fairground queen," as many Pro Streeters were derisively tagged in the later years of the movement. He's got some 9-second e.t. slips somewhere amongst his decades of memorabilia to prove it. "They're in there somewhere," he says. "They're probably with the *Hot Rod* guy's business card."

Hot Rod's loss was definitely **Car Craft**'s gain, and we couldn't be more thrilled to rediscover Roger's bad-ass Maverick, a time machine that still has a knockout effect 35 years on. While referring to the Nov. 1980 issue to help mimic the car's original pose for our recent shoot, we remarked offhandedly that it would be great if he still had the yellow **Car Craft** shirt he wore in the original shoot. "Oh, I still have it," Roger said without hesitation, disappearing into his home for a few minutes and emerging with it. "I never wore it after that photo shoot in 1980, but I kept it all the same." He put it on for our shoot, closing the loop on our trip down street-machine memory lane.



TECH NOTES

Who: Roger Tausch

What: 1972 Ford Maverick

Where: St. Charles, MI

Engine: The original engine was a 302 onto which Roger bolted a Dyers 6-71 huffer. As time progressed, the original engine was replaced with the current 302—well, it's actually a 306 now. It's a marvel of vintage and modern technologies, too, with old-school 351 Windsor heads fitted with Chevy valves, as well as original-style Ford rods and crank, and Ross low-compression blower pistons. Roger developed a crank-trigger ignition system for it, with an offset distributor that started life as a Chevy piece and was modified with a 3/4-inch beltdrive. It provides the necessary clearance for the blower, which is topped with a Hilborn injection system.

Transmission: It's a Ford Top Loader four-speed salvaged years ago from an original 1970 Boss 302. Gear changes are accomplished with a vintage Mr. Gasket Vertigate shifter, which was intended mostly for the dragstrip. There's no side-to-side movement, as all shifting is done in line, meaning you pull it back to shift to Second gear and

push it forward to go into Third and so on. A handle at the front of the shifter enables the trans to engage First gear, while a lever to the right is for Reverse.

Rearend: The same trashed Boss 302 donated its 9-inch rear axle, which was narrowed 35 years ago by Roger and his father on an ancient, 1800s-era lathe. There's a Detroit Locker diff in there, too, and a set of 4.57 gears.

Suspension: Roger's cousin, Ron Tausch, updated the front suspension with a Pinto/Mustang II independent system, which required a custom oil pan to clear the crossmember. In the rear, the original leaf springs were swapped for a coilover setup.

Brakes: They were only recently converted to four-wheel discs, but Roger says pedal effort is tougher now and the original drums stopped the car just fine.

Wheels/Tires: The noteworthy thing here is the wheels. They're vintage Centerline Indy aluminum rims, which haven't been made for about 25 years. They wear super-rare, Ford-logo, tri-bar center caps too. The tires are standard Pro Street fare, including the requisite Mickey Thompson Sportsman steamrollers in the rear.

Paint/Body: Originally metallic green,

the car was sprayed black in 1979. The multicolor graphics were laid out and painted in Roger's father's backyard only hours before leaving for the Street Machine Nationals. The body is stock, except for the hole in the hood, and the functional, vintage Funny Car ribbon-type parachute hung between the tail-lights. The wheeltubs were added after the graphics were painted, so Roger and friend Bob Gagne used wet towels on the sheetmetal to prevent burns or warping as the factory inner rear fenders were cut out. The rear wheel openings were also stretched slightly without affecting the graphics.

Interior: It's a step back in time, with old Street Machine Nationals dash plaques and vinyl seat and door panel trim that matches the exterior graphics. The bench seat was also notched to clear the Vertigate shifter; on top of the dash, a trio of Sun gauges have been there since about 1976, when Roger and a buddy twisted a drill bit between their fingers to drill the mounting holes, not being able to afford a very expensive (for then) 90-degree adapter. There's also a six-point rollbar in there, a functional 8-track player, and 1980s-vintage Ford Motorsport floor mats. ☐



WTF? (WHERE'S THE FUN?)

BRAKES ARE OVERRATED

Who: Lilly Temes

What: 1960 Chrysler Windsor

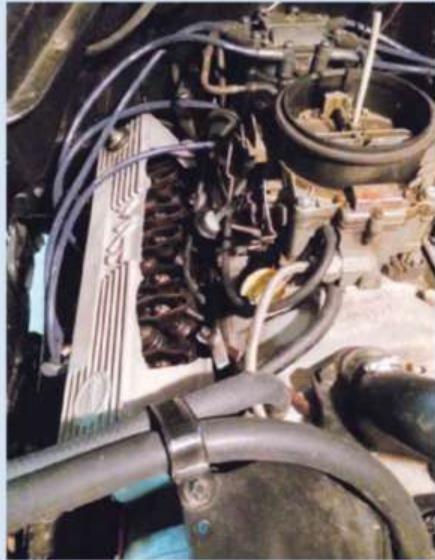
Where: Rocky River, OH

Why: "If the brakes ever work, you may see us at the Summer Nationals!"

We say: Maybe next year!



BLOWN-UP PARTS



This is my favorite set of M/T valve covers from a 327 in a 1966 Chevy C10 after they exploded when we tried to weld a hole in the oil pan while still on the engine. It's how we found out the Quadrajet carb was leaking raw fuel in the engine! Another set of valve covers and a 600-cfm Holley, and my daily driver is back on the road.

—Benjamin Springer,
via email

"The Camaro should not have been a design success, as it was based on an existing architecture and admittedly hurried to market to address the personal coupe revolution occurring with Baby Boomer customers."

—Ed Welburn, VP of GM Global Design, referring to the first-gen Camaro

→LETTERS

VORTEC/LA MOPAR

I just read the article on the junk-yard Vortec 350. You made awesome, flat torque for a street motor!

I started to wonder, why not do the same for the Dodge LA Magnum 360 from the trucks? I have always wanted to dump that and a 47RE into an old Wagoneer for some reason. I am not too well versed in the LA series, but I would have to imagine there is some aftermarket for it.

Then how about the JY roller 351W, F4TE block, from an F150/F250 that I saw a photo of in a few issues back? Granted, their E7 heads are trash—you could try it on E7s, then their later-style GT40Ps so it would be more on par with a junk-yard find and with the same theme: latest, old-style pushrod pushed to the limit for chump change.

I would love to read it! Plus it would stop the hate mail for "Chevy Craft."

—Eric B, via email
(P.S. I love the Mullet Camaro you guys are doing!)

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IN THE NEWS

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We need more pictures of Burnouts, please. While you're at it, send any of your compliments, complaints, random musings, or pet pictures to us. Here's how:

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don't forget: Include your make/model of car and your city/state.

disclaimer: If you can't write a complete sentence, don't worry, we will make your work comprehensible. That includes making up stuff we thought you meant.



CHEMCHINA BUYS PIRELLI

Pirelli is being purchased by ChemChina for \$7.7 billion. It'll bring awareness of Pirelli to the Chinese market, and ChemChina will have a chance to put its hands on technology for making premium tires.



IRWINDALE SPEEDWAY DEMOLISHED—FOR A MALL?

Looks like plans are moving forward for Irwindale Speedway to be demolished and replaced with a mall, thanks to the approval of the city council. Blame the city's growing population, which has been the cause of other racetracks to go away. The popular NHRA and NASCAR locale should be open through 2015.



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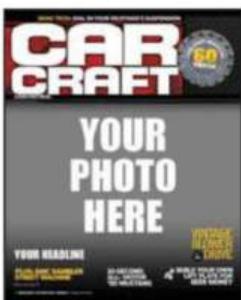


- 1 May 9: Salem Speedway
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- 3 July 18: Kentucky Motor Speedway
Whitesville, KY (PAVED)
- 4 August 29: Plymouth Speedway
Plymouth, IN (DIRT)
- 5 October 3: Memphis Int'l Raceway
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- 6 October 4: Memphis Int'l Raceway
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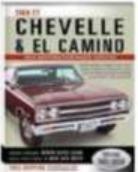
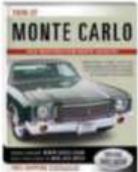
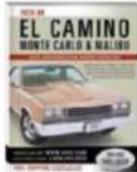
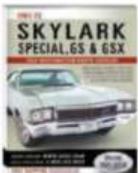
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REVIEW



MATERIAL FOR THE ARCHIVES, NOT FROM IT

This month's look back comes courtesy of Roy Gizicki of Sacramento, California. He sent us a big package of magazines he found at a local flea market called The Alameda. He described himself as old—a reader going back to “when the issues were small.” As some of you know, **Car Craft** was originally published as a digest-sized magazine, measuring roughly 5x8 inches, which, ironically, is smaller than most tablets and just slightly larger than most smartphones your kids are staring at right now. We didn’t graduate to a large format until six years later in the July 1959 issue. Flipping through our archive often gets us in trouble, because it’s so easy to get lost in the old issues—not the type of thing you want to do when deadlines are looming. Still, it’s interesting to see how much has changed, and how much remains the same through the decades. Thank you, Roy, for our recent trip down memory lane.

By John McGann / Photo: John McGann

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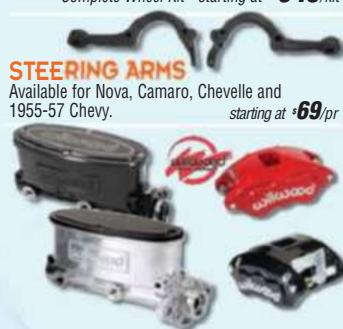


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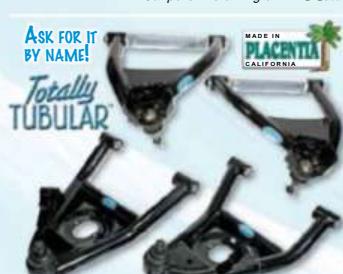


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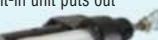
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